# Global Snow Cover Monitoring with Spaceborne Ku-Band Scatterometter

**S. V. Nghiem and W.-Y. Tsai**

Jet Propulsion Laboratory, California Institute of Technology, MS 300-235

4800 Oak Grove Drive, Pasadena, California 91109, U.S.A.

Tel: 818-354-2982, Fax: 818-393-3077, E-mail: nghiem@solar.jpl.nasa.gov

In this paper, we demonstrate for the first time the utility of spaceborne Ku-band scatterometter for global snow cover monitoring. Radar data were collected over the globe by the NASA Scatterometer operated at 14 GHz on board the Japanese ADEOS spacecraft from September 1996 to June 1997. This time period spanned the 1997 seasonal snow season. We investigate backscatter signatures of global snow cover throughout the snow season, which indicate detail delineations between different regional snow areas. We show the correlation of these delineations with the boundaries of different global snow classes defined by the U.S. Army Cold Regions Research and Engineering Laboratory snow classification system. We will show a video animation of the backscatter signature evolution over snow covered areas during the 1997 snow season. We present results from the first snow detection algorithm for Ku-band scatterometer data. We compare our results with U.S. Air Force global snow depth climatology, with Climate Prediction Center gridded snow charts, with National Operational Hydrologic Remote Sensing Center snow extent products derived from AVHRR and SSM/I, and in-situ snow station data from the National Climatic Data Center. Furthermore, we show that Ku-band radar backscatter is sensitive to the early snowmelt condition and illustrate the results for the event of the 1997 Northern Plains flooding, which caused loss of lives and several billion dollars in flood related damages. We discuss advantages and disadvantages of current and planned spaceborne scatterometers for global snow monitoring.